Thesis/
Reports
Chesemore,
D.L.

PSW FOREST AND RANGE
EXPERIMENT STATION
STATION LIBRARY COPY

FOOD PREFERENCES OF MULE DEER OF THE NORTH KINGS DEER HERD: CRITICAL HABITATS

1976-77 FY

FINAL REPORT
In fulfillment of PSW Grant No. 23

Dr. David L. Chesemore
Professor of Biology
California State University, Fresno

William L. Noblitt
Research Biologist

Charles J. Evans
Research Biologist

ABSTRACT

Tractable deer were used to determine the spring and summer food preferences of mule deer in the North Kings deer herd from May to October 1976. The spring food preference site was located north of Haslett Basin in Blue Canyon. On the summer range, two patch-cut meadow sites were located within 3 km of the intersection of Forest Service roads 10S66 and 10S36, while the third was located near Sugar Pine Hill.

On the spring migration site 10,221 bites were recorded in 4,259 minutes of observation time. During these feeding trials, 71 food items, including 65 species of vascular plants were eaten by the tractable deer. Browse species dominated the forage choices of the deer in Blue Canyon. Mariposa manzanita (Arctostaphylos mariposa), buck brush (Ceanothus cuneatus), and Sierra gooseberry (Ribes Roezlii) were the most preferred browse species. Brodiaeas (Brodiaea spp.) were the only important forb in the spring diet. No significant differences in spring forage choices between 1975 and 1976 were found.

On the summer range study sites, 63,595 bites were recorded. Included in this total are 5,849 bites recorded inside an enclosure on the Sugar Pine Hill study site. The deer utilized 87 food items, of which 77 were vascular plants. Browse species dominated the forage choice of the deer. Mountain whitethorn (Ceanothus cordulatus), greenleaf manzanita (Arctostaphylos patula), and Sierra gooseberry were the important browse species used by the deer. Two forbs, gayophytum (Gayophytum spp.) and pussy paws (Calyptridium umbellatum), were important on all study sites. Other forbs

important on the study sites where found were: trefoils (Lotus Purshianus and L. nevadensis), dogbane (Apocynum pumilum), sheep sorrel (Rumex angiocarpus), and tinkers penny (Hypericum anagalloides).

For all study sites no significant difference in forage choices between morning and evening trials or sexes of deer were found. Calculated selectivity indices indicated about 75 percent of the important plant species were preferred. A preferred species was eaten in greater proportion than its relative cover. Nutritional information from the literature indicates that deer may be able to select a nutritious diet at any of the locations studied.

TABLE OF CONTENTS

	Page
ABSTRACT	i
LIST OF TABLES	iv
LIST OF FIGURES	v
INTRODUCTION	1
METHODS AND MATERIALS	1
Tame Deer	1
Selection of Study Sites	2
Migration Corridor	2
Summer Range	2
Sampling of Food Preferences	5
Sampling of Vegetation	6
Preference Index	6
RESULTS	7
Migration Corridor	7
Food Preferences	7
Discussion	13
Summer Range	16
Description of Study Sites	16
Food Preferences	16
Discussion	22
LITERATURE CITED	34
LIST OF APPENDICES	36

LIST OF TABLES

Table		Page
1	Diet of tractable deer broken down by percent into three major forage classes for the Blue Canyon migration during the spring of 1976	8
2	Diet of tractable deer in May 1976 on the Blue Canyon study site, Sierra National Forest	10
3	Selectivity indices for important browse species in the diet of tractable deer on the Blue Canyon study site during May 1976	12
4	Diet of tractable deer by study site for the summer of 1976	18
5	Diet of tractable deer 3-5 June 1976 in the Sugar Pine Hill exclosure, Sierra National Forest	20
6	Diet of tractable deer broken down by percent into three major forage classes for the summer of 1976	21
7	Diet of tractable deer on the Sugar Pine Hill study site by sample period for the summer of 1976	23
8	Diet of tractable deer on the Clear Cut One study site by sample period for the summer of 1976	25
9	Diet of tractable deer on the Clear Cut Two study site by sample period for the summer of 1976	27
10	Selectivity indices for important species in the diet of tractable deer which were measured by line intercept on the Sugar Pine Hill study site during the summer of 1976	30
11	Selectivity indices for important species in the diet of tractable deer on the Clear Cut One study site during the summer of 1976	31
12	Selectivity indices for important species in the diet of tractable deer on the Clear Cut Two study site during the summer of 1976	32

LIST OF FIGURES

Figure		Page
1	Location of migration study site in Blue Canyon, Sierra National Forest, Fresno County, California	3
2	North Kings deer herd range with the location of the summer range study sites, Sierra National Forest, Fresno County, California	4

INTRODUCTION

The decreasing population of mule deer (Odocoileus hemionus) in the North Kings Deer Herd, estimated to have declined from some 15,000 animals in 1954 to about 3,500 animals in 1972, has produced demands for management to reverse this trend. While previous studies on the food preferences of mule deer in this area have provided considerable information on the diet of deer, additional information was needed before the theoretical cause of this population decline -- nutritional deficiencies that produce excessive fawn mortality during the summer and fall months -- can be verified (Evans et al. 1975, Chesemore 1975, Evans et al. 1976).

The ecological unit composed of a patch cut-meadow complex may be of critical importance to fawn survival (Ashcraft, personal communication). Since food preferences may vary with plant succession, deer diets were studied on variously aged patch cut-meadow complexes.

Feeding trials were also conducted inside an exclosure to determine the preferences of the tractable deer for selected introduced herbaceous species.

The study of dietary preferences of the North Kings Deer Herd consisted of two objectives:

1. To determine qualitatively the food preferences of mule deer on their spring migration corridors, and
2. To determine qualitatively the food preferences of mule deer on a variety of differently aged patch cut-meadow complexes on the summer range.

METHODS AND MATERIALS

Tame Deer

California mule deer fawns were supplied to us by the California Department of Fish and Game during the summers of 1974 and 1975. These fawns

were raised and trained according to the procedures described by Reichert (1972) and Evans et al. (1975).

Selection of Study Sites

All studies were conducted within the ecological unit commonly known as the North Kings Deer Herd Range (Fig. 1). Located on the west slope of the Sierra Nevada Mountains in Fresno County, the area is bounded on the east by the crest of the Sierras, on the south by the drainage of the Kings River, on the west by State Highway 168, and on the north by a system of ridges due east of Tamarack Mountain. This area encompasses the summer and winter ranges and the interconnecting migration routes of the herd.

Migration Corridor. The section of the Big Creek watershed known as the Blue Canyon Migration Corridor, beginning near Haslett Basin in the south, and terminating near the Dinkey Creek Road in the north, is a migration corridor for portions of the North Kings deer herd (Neal, personal communication) (Fig. 2). Because of the availability of data on wild deer from this region and data collected during the 1975 spring migration this area was again utilized in determining food preferences during the spring of 1976.

Summer Range. Use of a site by wild deer was the major criterion for selection of an area as a study site. Patch cut-meadow complexes were monitered by spotlight observations and by observing tracks, pellet groups, and forage usage on the site throughout the summer. The California Department of Fish and Game also supplied information on areas with high deer usage. Data collected by plant ecologists at California State University, Fresno who were concurrently studying succession patterns of clear cuts in the area was also utilized in study site selection.

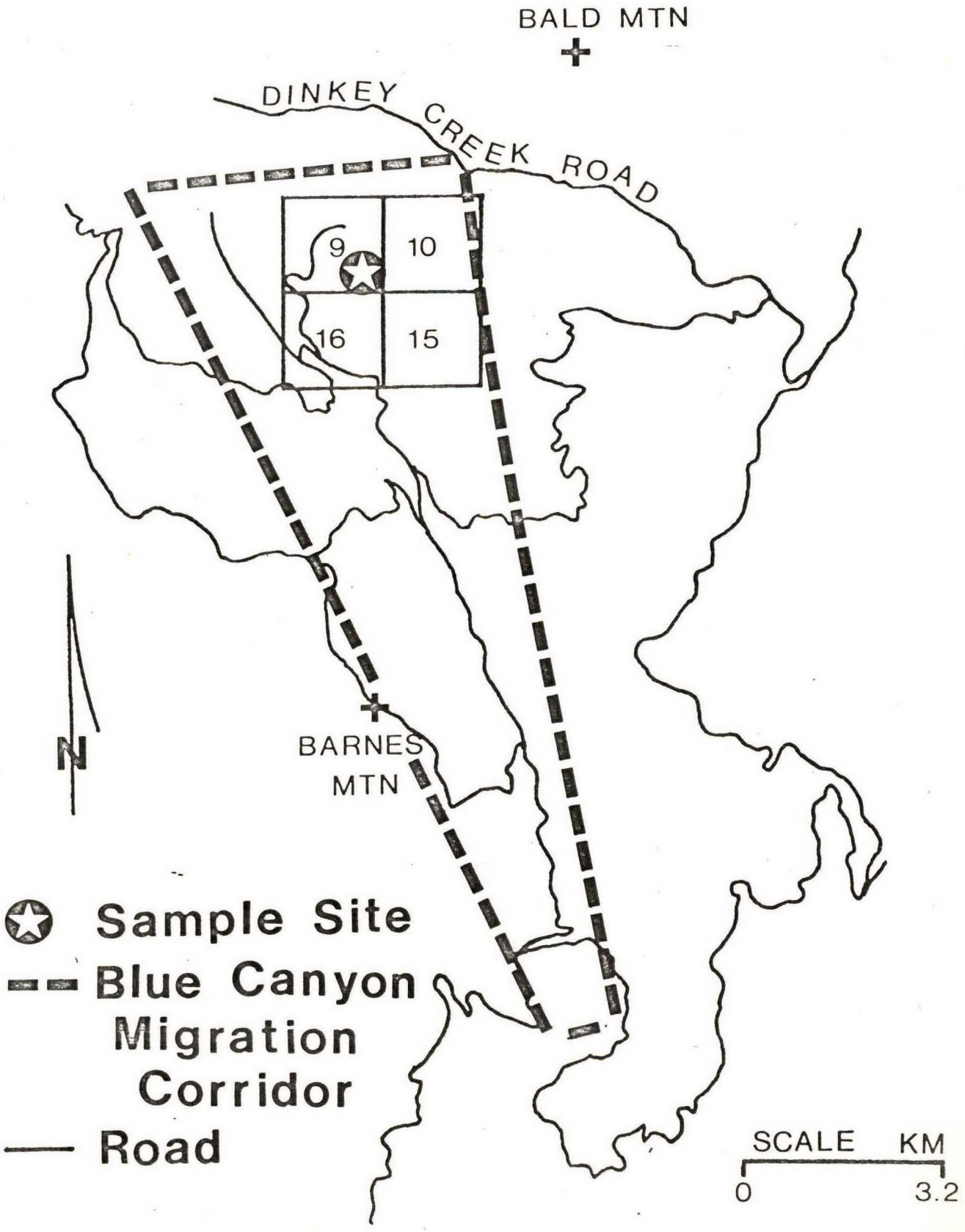

Figure 1. Location of migration study site in Blue Canyon, Sierra National Forest, Fresno County, California.

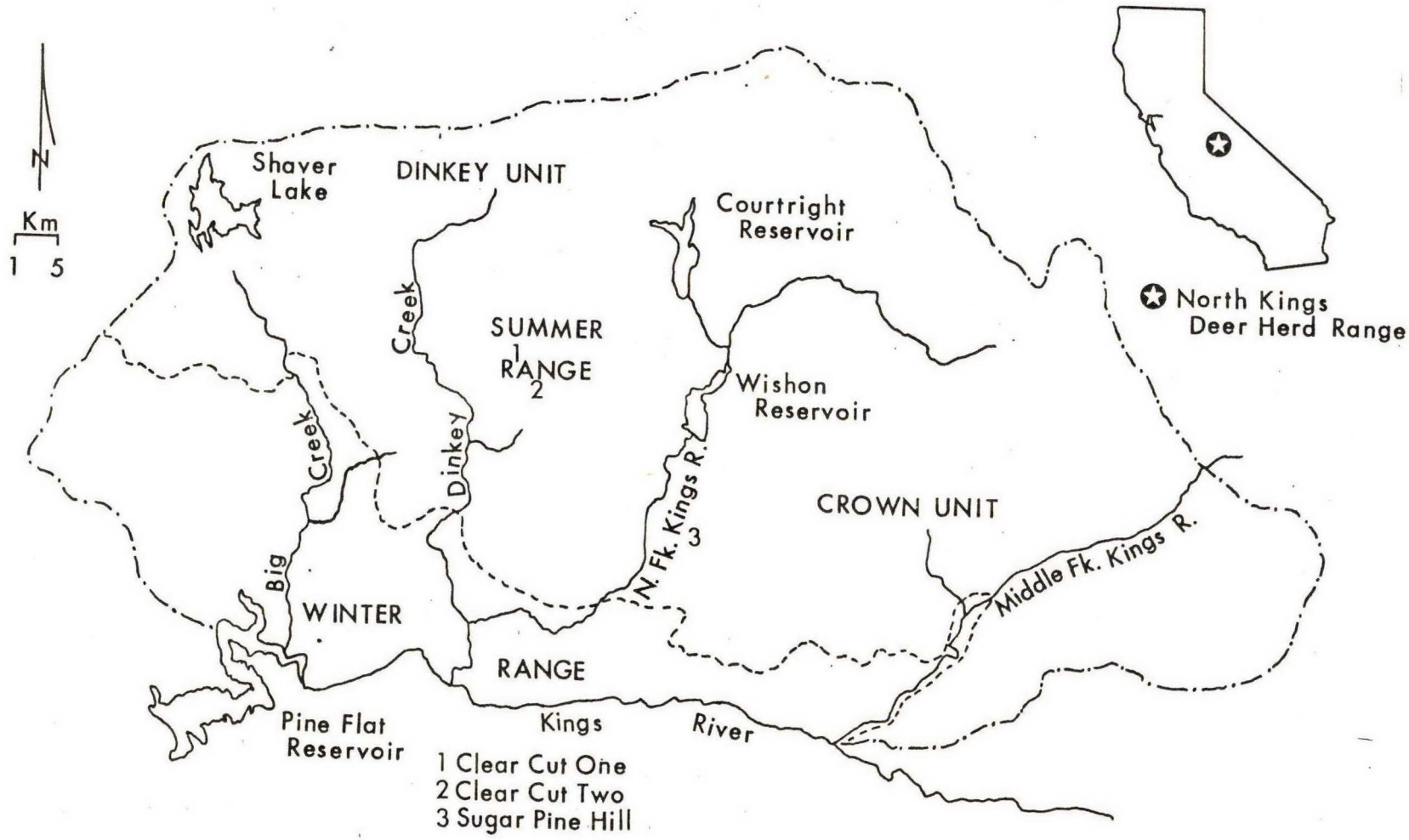

Figure 2. North Kings deer herd range with the location of the summer range study sites, Sierra National Forest, Fresno County, California.

Sampling of Food Preferences

The tractable deer were transported to the study sites in pairs or trios in an enclosed pickup truck. The animals were then taken to the approximate center of the study site and allowed to feed at will. Morning feeding trials began between 0600 and 0800 h; evening feeding trials began between 1600 and 1800 h. All feeding trials lasted until the deer ceased feeding or until it became too dark for observations. We attempted to work all animals an equal number of times. Between trials, the animals were kept in pens near the study sites or on campus at California State University, Fresno and were maintained on a high protein pelletized ration, alfalfa hay, and water. We did not restrict the ration of our deer because Wallmo et al (1972) found that their deer grazed most avidly when fed an unrestricted ration. Regelin et al. (1976) found tamed mule deer with access to unlimited amounts of concentrated feed selected the same forage species in a similar proportion of their diet as deer that received no supplemental feed.

Sampling was conducted on one site in the migration corridor. This study site has been described by Evans (1976). Sampling on the summer range was rotated in succession between three patch cut-meadow complexes.

Hand held, battery operated, cassette tape recorders were used to record bite data and phenological information for each trial. At the beginning and conclusion of each trial, the observer noted the time and weather conditions. A bite, the unit of measure used to describe food preferences, was defined as each discrete removal of part of a plant, or in some cases, the removal of the entire plant from the ground (Wallmo et al. 1972).

Percentage of diet was calculated for each food item by dividing the number of bites for each sampling period by the total number of bites recorded.

Diet composition was calculated for each sampling period, males, females, morning trials, and evening trials. Spearman's rho, a non-parametreic correlation coefficient, was used to test for correlations between diets of the sexes and morning and evening trials (Sokal and Rohlf 1969, Conover 1971). Differences were tested at the .05 significance level. Data summarization and tabulation was done on a preliminary basis in the field and completed by computer programs at the Center for Information Processing, California State University, Fresno.

Sampling of Vegetation

Cover of woody species for the Blue Canyon study site was estimated in 1975 and that data was again used in 1976. Cover on the patch cut-meadow study sites was estimated for shrub vegetation using the line intercept method (Canfield 1941, Mueller-Dombois and Ellenberg 1974). Based on previous feeding trials, we found normal feeding height for deer is less than 1.4 m above the ground. Any portion of a woody plant occuring on the intercept above this height was not recorded. Vegetation touching the intercept line was recorded to the nearest cm.

Lines 90 m in length were utilized to sample vegetative cover on the summer range. Lines were initiated from randomly selected starting points and azimuths. Vegetation was sampled at the 10 percent accuracy level with a precision of 5 percent.

Preference Index

We used a numerical selectivity index to estimate deer preferences for various species in the diet. The selectivity index = percent of diet / percent ground cover for that species. In the final reports for PSW grants 17 and 19

the selectivity indices were reported as percent of diet / percent relative cover. These selectivity indices were recalculated on the basis of absolute cover and are found in appendix VII. Other workers have used measures of preferences (Watts 1964, Neff 1974). We considered a preferred species one with a selectivity index greater than 1.0. This indicates that a species comprised a greater proportion of the diet than the ground cover. Conversely, a species with a selectivity index of less than 1.0 to be non-preferred by the deer.

RESULTS

Migration Corridor

Between 2 and 16 May 1976, a total of 10,221 bites was recorded in 4,259 minutes of observation time. The tractable deer consumed a total of 71 food items, or which 65 were species of vascular plants (Appendix V). Sampling effort was divided into three discrete periods.

Precipitation in the winter and spring of 1976 was only about 50 percent of normal, and was the lowest total recorded in nearly 50 years. Phenological development of plants was about 10 to 14 days earlier than in 1975 (Appendix I). It appeared to us that the bulk of the deer using the Blue Canyon Migration Corridor moved through the area about 10 May 1976.

Spearman's rho correlations between the sexes and times of day indicated that no significant differences existed in food preferences.

Food Preferences. Browse species dominated the forage choices of the deer in Blue Canyon and made up 75.26 percent of the total diet (Table 1). Forbs made up 19.08 percent and grasses and grass-like items comprised 4.25 percent of the total diet.

Table 1. Diet of tractable deer broken down by percent into three major forage classes for the Blue Canyon migration during the spring of 1976.

FORAGE TYPE	2-4 MAY	7-11 MAY	14-16 MAY	2-16 MAY
Browse	74.50	76.26	74.35	75.26
Forbs	20.32	16.79	21.55	19.08
Grasses and Grass-like	4.02	5.42	2.62	4.25
Other	1.15	1.53	1.48	1.42
TOTAL	99.99	100.00	100.00	100.01

Mariposa manzanita (Arctostaphylos mariposa) was the most important species in the diet of the tractable deer in May 1976 and comprised 21.28 percent of the total diet (Table 2). Flowers of mariposa manzanita comprised 13.17 percent of the diet and leaves comprised 8.11 percent of the total diet. The percentage of leaves in the diet increased with time and corresponded to the emergence of new growth. Mariposa manzanita was a preferred species for the total period and during two of the individual sampling periods (Table 3). Flowers were most abundant in the diet of the tractable deer during the first two sampling periods and then decreased. The decrease in the diet corresponded to the lower number of flowers present during the last sampling period. Numerically, the flowers were not indicated as preferred by the deer but the deer readily ate them. Russell (1932), Dixon (1934), and Jordan (1967) reported the use of this species by deer.

Buckbrush (Ceanothus cuneatus) comprised 14.21 percent of the total diet of the tractable deer in Blue Canyon in 1976 and was a fairly constant portion of the diet during all three sampling periods (Table 2). Several workers have reported the great importance of this species as a deer food in California (Dixon 1934, Longhurst et al. 1952, Jordan 1967). Buckbrush was preferred by the deer during all three sampling periods in 1976. The green and dry leaves of black oak (Quercus Kelloggii) made up 7.06 percent of the total diet in May 1976 and appeared to be preferred by the deer. The use of this species increased with the emergence of new leaves and the selectivity indices were well over 1.0 during the last two sampling periods (Table 3). Dixon (1934), Leach (1956), and Jordan (1967) considered black oak to have great importance as a deer food. Sierra gooseberry (Ribes Roezlii) comprised 9.46 percent of the total diet. Sierra gooseberry leafed out early and was more important in the early sampling periods. The deer appeared to like this

Table 2. Diet of tractable deer in May 1976 on the Blue Canyon study site, Sierra National Forest.

SPECIES	2-4 May		7-11 May		14-16 May		2-16 May	
	Bites	Percent	Bites	Percent	Bites	Percent	Bites	Percent
Ceanothus cuneatus	471	18.03	572	12.34	409	13.75	1452	14.21
Arctostaphylos mariposa (Flowers)	374	14.32	837	18.06	135	4.54	1347	13.17
Ribes Roelzii	291	11.14	461	9.95	215	7.23	967	9.46
Arctostaphylos mariposa (Leaves)	165	6.23	343	7.40	321	10.79	829	8.11
Brodiaea spp.	174	6.66	209	4.51	245	8.24	628	6.14
Quercus chrysolepis	79	3.02	212	4.54	193	6.49	484	4.74
Ceanothus integerrimus	134	5.13	205	4.42	141	4.74	480	4.70
Cercocarpos betuloides	128	4.90	192	4.14	157	5.28	477	4.67
Quercus Kelloggii (Green)	5	0.19	68	1.47	383	12.87	456	4.46
Pinus ponderosa	68	2.60	196	4.23	99	3.33	363	3.55
Grasses	86	3.29	132	2.85	66	2.22	284	2.78
Quercus Kelloggii (Dry)	86	3.29	118	2.55	41	1.38	245	2.40
Rhamnus crocea	62	2.37	141	3.04	37	1.23	240	2.35
Lotus micranthus	8	0.31	75	1.62	96	3.23	179	1.75

Table 2. (Continued)

SPECIES	2-4 May		7-11 May		14-16 May		2-16 May	
	Bites	Percent	Bites	Percent	Bites	Percent	Bites	Percent
Chamaebatia foliolosa	65	2.49	80	1.73	32	1.07	177	1.73
Grass-like	19	0.73	119	2.57	12	0.40	150	1.47
Saxifraga californica	117	4.48	26	0.56	0	0.00	143	1.40
OTHER FOOD ITEMS	280	10.72	648	13.98	393	13.21	1321	12.92
TOTAL	2612	99.99	4634	99.99	2975	100.00	10221	100.01

Table 3. Selectivity indices for important browse species in the diet of tractable deer on the Blue Canyon study site during May 1976.

SPECIES	2-4 May	7-11 May	14-16 May	2-16 May
Ceanothus integerrimus	34.200	29.467	31.600	31.333
Cercocarpus betuloides	32.667	27.600	35.200	31.133
Quercus Kelloggii (Green)	0.655	5.069	44.379	15.379
Ribes Roezlii	5.434	4.854	3.527	4.615
Ceanothus cuneatus	1.008	0.690	0.769	0.794
Arctostaphylos patula				
Flowers	0.481	0.607	0.363	0.443
Leaves	0.212	0.249	0.153	0.273
Quercus chrysolepis	0.101	0.154	0.218	0.159

species and numerical selectivity indices always were greater than 1.0. Dixon (1934) reported that deer ate this species a "fair amount." Evans et al. (1975) have reported the use of this species on the summer range of the North Kings herd. Other browse species important in the diet were canyon live oak (Quercus chrysolepis), deer brush (Ceanothus integerrimus), and mountain mahogany (Cercocarpus betuloides).

Forbs made up 19.08 percent of the total diet (Table 1). Brodiaeas (Brodiaea spp.) were the only herbaceous species to comprise more than 5 percent of the diet. Grasses and grass-like items as a whole made up 4.25 percent of the total diet (Table 1).

Discussion

The extremely dry conditions in 1976 presented an opportunity to compare deer food preferences in a nearly normal year (1975) with a very dry year. The response of vegetation to dry conditions could affect the nutritional value and palatability of forage species. Inadequate amounts of nutritious forage would adversely affect survival of deer.

The bulk of the migrating deer appeared to move about 10 days earlier in 1976 than 1975. The upward movements of the wild deer herd appear to be directly related to the phenological condition of plants on the migration corridor and winter range. Phenological conditions were very similar for the corresponding sampling periods in each year. Leopold et al. (1951) and Longhurst et al. (1952) felt that deer moved upward in response to the increase in new vegetative growth at higher elevations.

The Spearman's rho correlations indicated that food choices of the tractable deer were significantly different between the corresponding sample periods for 1975 and 1976. Even though the composition of the diet

was significantly different between 1975 and 1976, the species selected by the deer were similar for each year.

Mariposa manzanita was the most important species in the diet of the tractable deer in both years. The tractable deer ate a greater percentage of flowers of this species in 1976 than during 1975. In 1975, flowers made up only 1.07 percent of the total diet, but in 1976, flowers made up 13.17 percent of the total diet. Conversely, in 1976 the tractable deer ate a smaller percentage of leaves than during 1975. The entire statistical difference is explained by changes in deer preferences for different parts of Mariposa manzanita between 1975 and 1976. It is possible that the dry moisture conditions influenced the chemical content of the flowers and leaves and influenced the food preferences of the deer between years. We have not been able to find any research dealing with this topic in the relevant literature. We do not consider that the statistical difference between the two sets of data indicate any inconsistencies in the technique of using tractable deer to determine food preferences.

Mariposa manzanita was preferred in 1976 but not in 1975. Neither leaves nor flowers, when taken separately, were indicated as preferred items. The deer appeared to like the flowers and did not hesitate to take them. The use of the line intercept technique to estimate flower availability of any one species is crude and may adversely influence the numerical selectivity indices.

Buckbrush was an important part of the diet of the deer in both 1975 and 1976. This species comprised 12.86 percent of the diet in 1975 and 14.21 percent in 1976. In 1975, the use of buckbrush increased sharply as new growth emerged during the end of the sampling period. In 1976, use of buckbrush by the deer was more constant and did not increase greatly during the

latter stages of the sampling period. The more constant use of buckbrush in 1976 corresponds to the fact that more new growth of this species was available earlier to deer in 1976 than in 1975. Buckbrush was preferred by the deer during all three sampling periods in 1976 but only during the last period in 1975. Selectivity indices greater than 1.0 for this species occur when new growth is available. The importance and inferred palatability of this species for deer in California has long been discussed in the literature (Dixon 1934, Leopold et al. 1951, Longhurst et al. 1952). However, it appears to us that this species is preferred only when new growth is available.

Sierra gooseberry was important in both years and was preferred by the deer during all the sampling periods. Sierra gooseberry leafed earlier than many other browse species and was most important in the early diet. As new growth of other species became available, the use of Sierra gooseberry declined.

Deer brush was 12.04 percent of the diet in 1975, but only 4.70 percent of the diet in 1976. Selectivity indices indicate that this species was highly preferred. Deerbrush occurred in scattered patches on the study site and the deer did not encounter this species as frequently in 1976 as in 1975. The lower frequency of encounter probably accounted for the difference in percentage of diet between the years.

Black oak was about equally important in the diet during both 1975 and 1976. This species was preferred by the deer and use increased as new growth emerged.

Mountain mahogany (Cercocarpus betuloides) was a small part of the diet in both years and was a preferred species. Cronemiller and Bartholomew (1950) reported that mountain mahogany was preferred by deer.

Redberry (Rhamnus crocea) was 0.86 percent of the diet in 1975 and

2.35 percent of the diet in 1976 and appeared to be a preferred food species. Redberry was not sampled by the line intercept so no data is available to calculate a numerical selectivity index. Cronemiller and Bartholomew (1950) and Gibbens and Schultz (1963) considered redberry to be preferred by deer.

Brodiaeas were the only forb to make up a major portion of the diet in both years. Brodiaeas comprised 12.48 percent of the diet in 1975 and 6.14 percent of the diet in 1976. Leach and Hiehle (1957) reported that Brodiaeas were important for the Tehama herd.

As much of the study site in Blue Canyon is mature timber with a dense understory of mountain misery, there is little growth of herbaceous species. Herbaceous plants could become important in the diet of the deer if more of these plants were available.

Summer Range

Description of Study Sites. The patch-cut meadow complexes sampled during the summer of 1976 ranged in altitude from 2050 to 2320 m. The forest tree community before clear cutting was dominated by true firs (Abies concolor and A. magnifica). Two of the study sites, Clear Cut 1 and Clear Cut 2, were located in the Bear Creek drainage (Fig. 1). The third site was located near Sugar Pine Hill (Fig. 1). Clear Cut 1 (Sec. 11, T10S, R26E, MDM) was logged in 1969 and was about 13 ha in size. Clear Cut 2 (Sec. 23, T10S, R26E, MDM) was logged about 1966 and was about 11 ha in size. The topography of Clear Cut 1 varied from flat to about 20 degrees slope. The topography of Clear Cut 2 was gentle, with slopes to 10 degrees. The study site at Sugar Pine Hill (Sec. 24, T11S, R27E, MDM) was logged in 1971 and was about 32 ha in size. Topography of the Sugar Pine Hill site was gentle with occasional slopes to 15 degrees.

Mountain whitethorn (Ceanothus cordulatus) was the most abundant plant

species on Clear Cut 2 and Sugar Pine Hill. Squaw currant (Ribes cereum) was the most abundant species on Clear Cut 1. Other shrub species were secondary in abundance, depending on the study site. Greenleaf manzanita (Arctostaphylos patula), sticky currant (Ribes viscosissimum), pinemat manzanita (Arctostaphylos nevadensis), Sierra gooseberry, and chinquapin (Chrysolepis sempervirens) occurred on all three study sites. All three sites had been planted with Jeffrey pine (Pinus Jeffreyi) after clear cutting was finished. The pines were between 1 and 3 m in height. Sierra gooseberry was common on Clear Cut 2, but not on the other two sites. The shrub vegetation on Sugar Pine Hill was almost exclusively mountain whitethorn.

Herbaceous species found on the study sites were pussy paws (Calyptridium umbellatum), rock-cress (Arabis spp.), annual trefoils (Lotus spp.), and gayophytum (Gayophytum spp.). The abundance of these species varied from site to site (Appendixes IV, V, VI).

Results of the Spearman's rho correlations between sexes and times of day indicated no significant differences in feeding behavior.

Food Preferences. Between 3 June and 6 October 1976, a total of 63,595 bites were recorded on the three study sites (Table 4). Included in this total are 5,849 bites recorded inside an exclosure on the Sugar Pine Hill study site (Table 5). The tractable deer ate a total of 87 food items, of which 77 were vascular plants (Appendix I).

Browse species dominated the forage choices of the tractable deer on each of the three study sites and usually comprised over 60 percent of the diet (Table 6). Forb species varied in importance and usually comprised between 15 and 30 percent of the diet (Table 6). Grass and grass-like items were not important in the diets of the deer on the summer range study sites.

Table 4. Diet of tractable deer by study site for the summer of 1976

SPECIES	Sugar Pine Hill		Clear Cut One		Clear Cut Two		Total	
	Total Bites	Percent of Diet	Total Bites	Percent of Diet	Total Bites	Percent of Diet	Total Bites	Percent of Diet
Ceanothus cordulatus	19234	62.60	9529	58.37	7938	47.99	36701	57.71
Gayophytum spp.	1049	3.41	1721	10.54	1174	7.10	3944	6.20
Ribes Roezlii	406	1.32	102	0.62	2680	16.20	3188	5.01
Arctostaphylos patula	1441	4.69	714	4.37	508	3.07	2663	4.19
Calyptridium umbellatum	908	2.96	548	3.36	1006	6.08	2462	3.87
Miscellaneous Forbs	998	3.25	339	2.08	526	3.18	1863	2.93
Miscellaneous Shrubs	421	1.37	650	3.98	756	4.57	1827	2.87
Pinus Jeffreyi	540	1.76	310	1.90	436	2.64	1286	2.02
Apocynum pumilum	1167	3.80	...	...	52	0.31	1219	1.92
Grasses	1157[1]	3.76[1]	44	0.27	9	0.05	1210[1]	1.90[1]
Lotus nevadensis	1048	3.41	...	...	7	0.04	1055	1.66
Lotus Purshianus	817	2.66	39	0.24	148	0.89	1004	1.58
Arabis spp.	671	2.18	43	0.26	258	1.56	972	1.53

Table 4. (Continued)

SPECIES	Sugar Pine Hill		Clear Cut One		Clear Cut Two		Total	
	Total Bites	Percent of Diet	Total Bites	Percent of Diet	Total Bites	Percent of Diet	Total Bites	Percent of Diet
Abies concolor Abies magnifica	124	0.40	614	3.76	155	0.94	893	1.40
Rumex angiocarpus	113	0.37	659	4.04	...	...	772	1.21
Potentilla glandulosa	23	0.08	408	2.50	338	2.04	769	1.21
Phacelia hydrophylloides Phacelia mutabilis	11	0.04	322	1.97	363	2.19	696	1.09
Hypericum anagalloides	401	1.31	15	0.09	...	...	416	0.65
Grass-like	38	0.12	42	0.26	23	0.14	103	0.16
OTHER FOOD ITEMS	160	0.52	227	1.39	165	1.00	552	0.87
TOTAL	30727	100.01	16326	100.00	1654	99.99	63595	99.98

[1]Includes 810 bites of introduced species

Table 5. Diet of tractable deer 3-5 June 1976 in the Sugar Pine Hill exclosure, Sierra National Forest

SPECIES	Bites	Percent of diet
Ceanothus cordulatus	3513	60.06
Calyptridium umbellatum	411	7.03
Arctostaphylos patula	373	6.38
Arabis spp.	301	5.15
Dactylis glomerata[1]	230	3.93
Agropyron intermedia[1]	173	2.96
Sitanion jubatum	154	2.63
Bromus biebersteinii[1]	143	2.44
Agropyron trichophorum[1]	135	2.31
Apocynum pumilum	104	1.78
Pinus Jeffreyi	63	1.08
Miscellaneous Shrubs	57	0.97
Onobrychis viciaefolia[1]	53	0.91
Miscellaneous Forbs	50	0.86
Medicago sativa[1]	49	0.84
Festuca arundinacea[1]	27	0.46
Miscellaneous Grasses	2	0.03
OTHER FOOD ITEMS	11	0.16
TOTAL	5849	99.98

[1]Introduced species

Table 6. Diet of tractable deer broken down by percent into three major forage classes for the summer of 1976

	3-5 Jun	28 Jun-1 Jul	26-28 Jul	23-26 Aug	20-22 Sep	4-6 Oct	3 Jun-6 Oct
			Sugar Pine Hill				
Browse	68.49	78.85	55.36	74.73	87.70	79.29	72.14
Forbs	16.55	18.66	41.57	24.32	11.20	19.13	23.45
Grasses and Grass-like	14.77	0.62	2.24	0.81	0.62	1.55	3.77
TOTAL	99.81	98.13	99.17	99.86	99.52	99.97	99.36
	16-18 Jun	5-8 Jul	2-5 Aug	28-30 Aug	16 Jun-30 Aug		
			Clear Cut 1				
Browse	86.40	63.49	73.85	78.50	73.01		
Forbs	10.59	33.79	25.06	21.32	25.08		
Grasses and Grass-like	0.26	0.52	0.04	0.07	0.27		
TOTAL	97.25	97.80	98.95	99.89	98.36		
	21-24 Jun	12-15 Jul	9-12 Aug	2-4 Sep	21 Jun-4 Sep		
			Clear Cut 2				
Browse	78.63	74.66	76.02	69.23	75.40		
Forbs	19.30	24.26	23.60	30.09	23.41		
Grasses and Grass-like	0.04	...	0.03	0.16	0.05		
TOTAL	97.97	98.92	99.65	99.48	98.86		

Discussion. Four feeding trials were conducted inside the exclosure on Sugar Pine Hill to test the preferences of the tractable deer for planted introduced herbaceous species of plants. Mountain whitethorn was the most important species selected by the deer and comprised 60.06 percent of the total diet (Table 5). Greenleaf manzanita, pussy paws, and rock-cress were other species that made up more than 5 percent of the diet. Orchard grass (Dactylis glomerata) was the only planted species in the exclosure to make up more than 30 percent of the total diet. Alfalfa (Medicago sativa) and sainfoin (Onybrychis viciaefolia) were small parts of the diet but appeared to be preferred by the tractable deer. Much of the foliage of these legumes was eaten by the deer when we were not in the exclosure recording bites.

A total of 17,100 m of line intercept was measured on the three clear cuts to provide data on the availability of plant species for the tractable deer; 7,920 m were measured on Clear Cut 2; 7,290 m were measured on Clear Cut 1; and 1,890 m were measured on Sugar Pine Hill (Appendixes IV, V, VI).

Mountain whitethorn was by far the most important species in the diet of the deer. This species comprised 57.71 percent of the total summer range diet and between 47 and 63 percent of the total diet on the individual study sites (Tables 4, 7, 8, 9). Mountain whitethorn comprised 50 to 70 percent of the diet on Clear Cut 1 and Sugar Pine Hill (Tables 7, 8). Mountain whitethorn was initially 52 percent of the diet on Clear Cut 2 and declined to 42 percent of the diet at the end of the summer (Table 9).

The numerical selectivity indices show that mountain whitethorn was a preferred species on all three study sites in 1976. Dayton (1931), Dixon (1934), Longhurst et al. (1952), and Ferrel and Leach (1957) considered mountain whitethorn to be an important deer food. Our work in the summer of

Table 7. Diet of tractable deer on the Sugar Pine Hill study site by sample period for the summer of 1976

SPECIES	3-5 Jun		28 Jun - 1 Jul		26-28 Jul		23-26 Aug		20-22 Sep		4-6 Oct		3 Jun - 6 Oct	
	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet	Total	Percent of Diet
Ceanothus cordulatus	3513	60.06	3761	64.98	3109	49.78	4648	66.37	2443	74.96	1760	68.14	19234	62.60
Arctostaphylos patula	373	6.38	438	7.57	191	3.06	233	3.33	143	4.39	63	2.44	1441	4.69
Apocynum pumilum	104	1.78	74	1.28	93	1.49	313	4.47	287	8.81	296	11.46	1167	3.80
Miscellaneous Forbs	152	2.60	113	1.95	1048	16.78	211	3.01	4	2.12	18	0.70	1145	3.73
Miscellaneous Grasses	864	14.77	36	0.62	140	2.24	57	0.81	20	0.61	40	1.55	1157	3.77
Gayophytum spp.	...	...	84	1.45	324	5.19	572	8.17	20	0.61	49	1.90	1049	3.41
Lotus nevadense	...	...	127	2.19	611	9.78	244	3.48	17	0.52	49	1.90	1048	3.41
Calyptridium umbellatum	411	7.03	317	5.48	122	1.95	58	0.83	...	...	...	...	908	2.96
Lotus Purshianus	...	...	224	3.87	257	4.12	251	3.58	6	0.18	79	3.06	817	2.66
Arabis spp.	301	5.15	141	2.44	141	2.26	54	0.77	31	0.95	3	0.12	671	2.18
Miscellaneous Shrubs	25	0.43	222	3.84	39	0.62	151	2.16	43	1.32	65	2.52	545	1.77

Table 7. (Continued)

SPECIES	3-5 Jun		28 Jun - 1 Jul		26-28 Jul		23-26 Aug		20-22 Sep		4-6 Oct		3 June - 6 Oct	
	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet	Total Bites	Percent of Diet
Pinus Jeffreyi	63	1.08	41	0.71	90	1.44	88	1.26	138	4.23	120	4.65	540	1.76
Ribes Roezlii	32	0.55	102	1.76	28	0.45	113	1.61	91	2.79	40	1.55	406	1.32
Grass-like	...	...	23	0.40	10	0.16	2	0.03	2	0.06	1	0.04	38	0.12
OTHER FOOD ITEMS	11	0.16	85	1.47	42	0.67	8	0.11	14	0.43	...	...	160	0.52
TOTAL	5849	99.99	5788	100.01	6245	99.99	7003	99.99	3259	99.98	2538	100.03	30727	100.01

Table 8. Diet of tractable deer on the Clear Cut One study site by sample period for the summer of 1976.

SPECIES	16-18 Jun		5-8 Jul		2-5 Aug		28-30 Aug		16 Jun - 30 Aug	
	Bites	Percent of diet	Bites	Percent of diet	Bites	Percent of diet	Bites	Percent of diet	Total	Percent of diet
Ceanothus cordulatus	2198	72.54	3084	49.69	2589	58.81	1658	61.68	9529	58.37
Gayophytum spp	55	1.82	927	14.94	493	11.20	246	9.15	1721	10.54
Arctostaphylos patula	195	6.44	300	4.83	121	2.75	98	3.65	714	4.37
Rumex angiocarpus	44	1.45	249	4.01	360	8.18	6	0.22	659	4.04
Abies spp.	36	1.19	216	3.48	162	3.68	200	7.44	614	3.76
Calyptridum umbellatum	45	1.49	178	2.87	58	1.32	267	9.93	548	3.36
Miscellaneous Shrubs	56	1.85	174	2.80	211	4.79	94	3.50	535	3.28
Miscellaneous Forbs	72	2.38	252	4.06	100	2.27	48	1.79	472	2.89
Potentilla glandulosa	...	...	371	5.98	31	0.70	6	0.22	408	2.50
Pinus Jeffreyi	90	2.97	63	1.02	99	2.25	58	2.16	310	1.90
Phacelia hydrophylloides	105	3.47	120	1.93	61	1.39	...	...	286	1.75
Arctostaphylos nevadensis	43	1.42	103	1.66	69	1.57	2	0.07	217	1.33

Table 8. (Continued)

SPECIES	16-18 Jun		5-8 Jul		2-5 Aug		28-30 Aug		16 Jun - 30 Aug	
	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet	Total	Percent of Diet
Miscellaneous Grasses	8	0.26	32	0.52	2	0.05	2	0.07	44	0.27
Grass-like	6	0.20	25	0.40	11	0.25	...	...	42	0.26
OTHER FOOD ITEMS	77	2.54	112	1.80	35	0.80	3	0.11	227	1.39
TOTAL	3030	100.02	6206	99.99	4402	100.01	2688	99.99	16326	100.01

Table 9. Diet of tractable deer on the Clear Cut Two study site by sample period for the summer of 1976.

SPECIES	21-24 Jun		12-15 Jul		9-12 Aug		2-4 Sep		21 Jun - 4 Sept	
	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet	Total	Percent of Diet
Ceanothus cordulatus	2807	52.70	2430	46.37	1637	47.18	1064	42.46	7938	47.99
Ribes Roezlii	850	15.96	777	14.83	559	16.11	494	19.71	2680	16.20
Gayophytum spp.	222	4.17	310	5.92	428	12.33	214	8.54	1174	7.10
Calyptridium umbellatum	380	7.13	221	4.22	99	2.85	306	12.21	1006	6.08
Miscellaneous Forbs	102	1.92	408	7.79	141	4.06	117	4.67	768	4.64
Miscellaneous Shrubs	72	1.35	252	4.81	234	6.74	92	3.67	650	3.39
Arctostaphylos patula	163	3.06	264	5.04	52	1.50	29	1.16	508	3.07
Pinus Jeffreyi	131	2.46	150	2.86	103	2.97	52	2.08	436	2.64
Potentilla glandulosa	100	1.88	233	4.45	5	0.14	...	...	338	2.04
Phacelia mutabilis	141	2.65	26	0.50	74	2.13	87	3.47	328	1.98
Chrysolepis sempervirens	165	3.10	39	0.74	53	1.53	4	0.16	261	1.58

Table 9. (Continued)

SPECIES	21-24 Jun		12-15 Jul		9-12 Aug		2-4 Sep		21 Jun - 4 Sep	
	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet	Bites	Percent of Diet
Arabis spp.	83	1.56	73	1.39	72	2.07	30	1.20	258	1.56
Grass-like	19	0.36	4	0.08	1	0.03	...	...	23	0.14
Miscellaneous Grasses	4	0.08	...	...	...	...	4	0.16	9	0.05
OTHER FOOD ITEMS	87	1.63	53	1.01	12	0.35	13	0.52	165	1.00
TOTAL	5326	100.01	5240	100.01	3470	99.99	2506	100.01	16542	100.00

1975 indicated that mountain whitethorn was preferred by the tractable deer on study sites near Bald Mountain (Chesemore et al. 1976).

Sierra gooseberry was the only other browse species to comprise more than 10 percent of the total diet on any of the study sites. Sierra gooseberry was important in the diet of the deer only on Clear Cut 2 and comprised 16.20 percent of the total diet. We feel that the lower use of mountain whitethorn on Clear Cut 2 relative to the other two study sites is due to the higher use of Sierra gooseberry on this site. Numerical selectivity indices, with two exceptions, indicate that Sierra gooseberry was preferred for the entire summer on all three study sites (Tables 10, 11, 12). Selectivity indices for the individual sampling periods varied between 0.66 and 36.81, according to consumption by the deer in that sampling period. It was reported that Sierra gooseberry was a preferred species during the summer of 1975 (Chesemore et al. 1976). Dixon (1934), Jordan (1967), Salwasser (1974), and Evans (1976) also reported the use of Sierra gooseberry by deer.

Greenleaf manzanita was present on all three sites and comprised between 2 and 6 percent of the diet, dpending on the study site and sampling period (Tables 7, 8, 9). This species was more important during the first sampling periods and declined with time. Leach (1956) and Chesemore et al (1976) have reported the use of this species by deer. Greenleaf manzanita was preferred for the total summer on all three study sites. This species had its highest selectivity indices early in the summer, and selectivity indices decreased as the summer progressed. We reported that this species had selectivity indices greater than 1.0 in the summer of 1975 (Chesemore et al. 1976).

Gayophytum was the most important forb species eaten by the tractable deer. It occurred on all three study sites and comprised 3 to 11 percent of

Table 10. Selectivity indices for important species in the diet of tractable deer which were measured by line intercept on the Sugar Pine Hill study site during the summer of 1976.

SPECIES	28 Jun-1 Jul	26-28 Jul	23-26 Aug	20-22 Sep	4-6 Oct	28 Jun-4 Oct
Gayophytum spp	152.63	54.32	860.00	64.21	200.00	358.95
Apocynum pumilum	8.54	9.93	29.80	58.73	76.40	25.33
Arabis spp	12.20	11.30	3.85	4.75	0.60	10.90
Arctostaphylos patula	8.70	3.51	3.82	5.05	2.80	5.39
Ribes Roezlii	2.59	0.66	2.37	4.10	2.28	1.94
Ceanothus cordulatus	1.36	1.04	1.39	1.57	1.43	1.31
Pinus Jeffreyi	0.22	0.44	0.38	1.28	1.41	0.53

Table 11. Selectivity indices for important species in the diet of tractable deer on the Clear Cut One study site during the summer of 1976

SPECIES	16-18 Jun	5-8 Jul	2-5 Aug	28-30 Aug	16 Jun-30 Aug
Potentilla glandulosa		664.44	77.78	24.44	277.78
Rumex angiocarpus	76.31	211.05	430.52	11.58	212.63
Calyptridium umbellatum	70.95	136.67	62.85	427.86	160.00
Abies spp	17.00	49.71	52.57	106.29	53.71
Arctostaphylos nevadensis	15.78	18.44	17.44	0.78	14.78
Arctostaphylos patula	18.94	14.21	8.09	10.74	12.85
Ribes Roezlii	2.61	4.80	36.81	0.84	12.39
Ceanothus cordulatus	8.36	5.72	6.87	7.11	6.72
Gayophytum spp	1.06	8.73	6.55	5.35	6.16
Sambucus caerulea	0.09	0.24	0.94	2.21	0.74
Pinus Jeffreyi	0.65	0.22	0.49	0.47	0.42
Phacelia hydrophylloides	0.85	0.47	0.34		0.38
Ribes cereum	0.12	0.03	0.06	0.03	0.06

Table 12. Selectivity indices for important species in the diet of tractable deer on the Clear Cut Two study site during the summer of 1976.

SPECIES	21-24 Jun	12-15 Jul	9-12 Aug	2-4 Sep	21 Jun-4 Sep
Lotus Purshianus		667.50	137.50		222.50
Chrysolepis sempervirens	281.81	67.28	139.09	14.54	143.65
Calyptridium umbellatum	121.83	70.33	47.50	203.50	101.33
Potentilla glandulosa	67.14	158.93	5.00		72.86
Abies spp	10.62	34.70	45.00	36.25	29.32
Gayophytum spp	6.42	9.11	18.97	13.14	10.92
Ceanothus cordulatus	5.96	5.25	5.34	4.80	5.43
Arctostaphylos patula	4.31	7.10	2.11	1.63	4.33
Ribes Roezlii	2.57	2.39	2.54	3.17	2.61
Arabis spp	0.95	0.85	1.26	0.73	0.95
Sambucus caerulea	0.16	0.34	0.98	1.32	0.73
Pinus Jeffreyi	0.63	0.73	0.76	0.53	0.68
Phacelia mutabalis	0.58	0.11	0.47	0.76	0.44
Ribes cereum	0.08	0.13	0.10	0.28	0.13
Carex spp	0.27	0.06	0.02		0.11
Phacelia racemosa	0.05	0.08		0.15	0.08
Solanum Xantii		0.05	0.03	0.21	0.03

the total diets (Tables 7, 8, 9). Gayophytum was most important during the middle part of the summer on all three study sites. The selectivity indices for gayophytum were greater than 1.0 for each of the sampling periods on all three study sites. The numerical selectivity indices on Sugar Pine Hill are very large and indicate a high degree of selectivity for this species on this study site.

Pussy paws was common on Clear Cut 2 and comprised 6.08 percent of the total diet on that study site. Available selectivity indices indicate a high degree of selection for this species on Clear Cut 1 and Clear Cut 2. Sheep sorrel (Rumex angiocarpus) was common on Clear Cut 1 and comprised 4.04 percent of the diet on that study site. Dixon (1934) and Chesemore et al. (1976) reported the use of this species by deer.

Three species of annual trefoil (Lotus Purshianus, L. neviadensis, and L. oblongifolius) were common but scattered on Sugar Pine Hill and comprised over 6 percent of the diet for the entire summer and over 5 percent of the diet for four of the six sampling periods (Table 7). These species seemed to be preferred species but were not measured by the line intercept.

Other species, as cinqefoil (Potentilla glandulosa), were preferred by the deer but were not common enough to be important in the diet. Other species as nightshade (Solanum Xantii) and squaw current were not preferred or important in the diet even though abundant on the study site.

LITERATURE CITED

Canfield, R. 1941. Application of the line intercept method in sampling range vegetation. J. For. 39 (4):388-394.

Chesemore, D. L. 1975. Food preferences of migrating mule deer in the North Kings deer herd range. Unpubl. Final report for PSW Grant 17 from California State Univ., Fresno. 113 pp. Mimeogr.

Chesemore, D. L., W. Noblitt, C. Evans, and D. Haines. 1976. Food preferences of mule deer on their summer range. Unpubl. Final report for PSW Grant 19 from California State Univ., Fresno. 124 pp. Mimeogr.

Conover, W. J. 1971. Practical nonparametric statistics. John Wiley and Sons, Inc., New York. 462 pp.

Cook, C. W. 1971. Comparative values of forbs, grasses, and shrubs. Pages 303-310. In Wildland shrubs--their biology and utilization. U. S. Dept. Agric., For. Serv., Gen Tech. Rep. INT-1.

Cronemiller, F. C. and P. S. Bartholomew. 1950. The California mule deer in chaparral forest. California Fish Game 36 (4):343-365.

Dixon, J. S. 1934. A study of the life history and food habits of mule deer in California-Part II: food habits. California Fish Game 20 (3):316-354.

Evans, C. J. 1976. Winter and spring food preferences of the North Kings deer herd. M.A. Thesis, California State Univ., Fresno. 99 pp.

Evans, C. J., R. D. Haines, and D. L. Chesemore. 1975. Deer eat the darndest things. Outdoor California 36 (3):1-4.

Evans, C. J., R. D. Haines, and D. L. Chesemore. 1976. Winter range food preferences of the North Kings deer herd. Cal-Neva Wildl. 1976:26-37.

Gibbens, R. P. and A. M. Schultz. 1963. Brush manipulation of a winter deer range. California Fish Game 49 (2):95-118.

Jordan, P. A. 1967. Ecology of migratory deer in the San Joaquin River drainage. Ph.D. Thesis. Univ. California, Berekeley. 277 pp.

Leach, H. 1956. Food habits of the Great Basin deer herds of California. California Fish Game 42 (4):243-308.

Leach, H. and J. L. Hiehle. 1957. Food habits of the Tehama deer herd. California Fish Game 43 (3):161-178.

Leopold, A. S., T. Riney, R. McCain, and L. Tevis, Jr. 1951. The Jawbone deer herd. California Dept. Fish and Game, Game Bull. 4. 139 pp.

Longhurst, W. M., A. S. Leopold, and R. F. Dasmann. 1952. A survey of California deer herds, their ranges and management problems. California Dept. Fish and Game, Game Bull. 6. 136 pp.

Mueller-Dombois, D. and H. Ellenberg. 1974. Aims and methods of vegetation ecology. John Wiley and Sons, Inc., New York. 547 pp.

Munz, P. A. 1959. A California flora. Univ. California Press, Berkeley, 1681 pp.

Munz, P. A. 1968. Supplement to a California flora. Univ. California Press, Berkeley. 224 pp.

Neff, J. D. 1974. Forage preferences of trained mule deer on the Beaver Creek Watersheds. Arizona Dept. Fish Game, Spec. Rept. 4. 61 pp.

Regelin, W. L., R. M. Bartman, D. W. Reichert, and P. H. Neil. 1976. The influence of supplemental feed on food habits of tamed deer. U. S. For. Serv., Rocky Mt. For. Range Expt. Sta. Res. Note RM-317. 7 pp.

Reichert, D. W. 1972. Rearing and training deer for food habits studies. U. S. For. Serv., Rocky Mt. For. Range Expt. Sta. Res. Note RM-208. 7 pp.

Russell, C. P. 1932. Seasonal migration of mule deer. Ecol. Monogr. 2 (1):1-46.

Salwasser, H. J. 1974. North Kings deer herd fawn production and survival study. California Dept. Fish and Game, Annual Report, PRW-51-R. 78 pp.

Sokal, R. R. and F. J. Rohlf. 1969. Biometry. W. H. Freeman and Co., San Francisco. 776 pp.

Wallmo, O. C. and D. J. Neff. 1970. Direct observations of tamed deer to measure consumption of natural forage. Pages 105-110. In Range and wildlife habitat evaluation--a research symposium. U. S. Dept. Agric. Misc. Publ. 1147. 220 pp.

Watts, C. R. 1964. Forage preferences of captive deer while free ranging in a mixed oak forest. M.S. Thesis, Pennsylvania State Univ., University Park. 65 pp.

LIST OF APPENDICES

APPENDIX		Page
I	Food items eaten by tractable deer in 1976 on the North Kings deer herd range, Sierra National Forest: Blue Canyon migration corridor 2-16 May (1) and summer range 3 June - 6 October--Clear Cut One (2), Clear Cut Two (3), Sugar Pine Hill (4), and in the Sugar Pine Hill exclosure (4a)	37
II	Plant phenology observations on the Blue Canyon study site during May 1976	43
III	Plant phenology observations for patchcut-meadow study sites during summer 1976 in the Sierra National Forest	45
IV	Vegetative cover available to deer as measured by the line intercept method for the Sugar Pine Hill study site on the summer range of the North Kings deer herd, Sierra National Forest	52
V	Vegetative cover available to deer as measured by the line intercept method for the Clear Cut one study site on the summer range of the North Kings deer herd, Sierra National Forest	54
VI	Vegetative cover available to deer as measured by the line intercept method for the Clear Cut two study site on the summer range of the North Kings deer herd, Sierra National Forest	57
VII	Selectivity indices from PSW grants 17 and 19 recomputed on the basis of absolute cover	60

APPENDIX I. Food items eaten by tractable deer in 1976 on the North Kings deer herd range, Sierra National Forest: Blue Canyon migration corridor 2-16 May (1) and summer range 3 June - 6 October-- Clear Cut One (2), Clear Cut Two (3), Sugar Pine Hill (4), and in the Sugar Pine Hill exclosure (4a).

PLANTS

Abies concolor	2, 3, 4
Abies magnifica	2, 3, 4
Aesculus california	1
Agropyron intermedia*	4a
Agropyron trichphorum*	4a
Alchemilla occidentalis	1
Apocynum pumilum	3, 4, 4a
Arabis platysperma	2, 3, 4, 4a
Arabis rectissima	2, 3, 4, 4a
Arabis repanda	2, 3, 4, 4a
Arceuthobium compylopodium	3
Arctostaphylos mariposa	1, 3, 4
Arctostaphylos nevadensis	2, 4, 4a
Arctostaphylos patula	2, 3, 4, 4a
Athysanus pusillus	1
Barbarea orthoceras	3
Brodiaea lutea	1
Brodiaea pulchella	1
Bromus biebersteinii*	4a
Bromus Orcuttianus	2, 3

---

*Indicates introduced species

Bromus tectorum 1

Calocedrus decurrens 1

Calochortus amoenus 1

Calyptridium umbellatum 2, 3, 4, 4a

Calystegia malacophylla 2, 3

Carex spp. 1, 2, 3, 4

Castilleja disticha 3, 4a

Ceanothus cordulatus 2, 3, 4, 4a

Ceanothus cuneatus 1

Ceanothus Integerrimus var. californicus 1

Ceanothus parvifolius 4

Cerastium viscosum 1

Cercocarpus betuloides 1

Chaenactis Douglasii 2, 3

Chamaebatia foliolosa 1

Chlorogalum pomeridianum 1

Chrysolepis sempervirens 2, 3, 4

Cirsium occidentale 4a

Clarkia rhomboidea 1, 3

Collinsia Childii 1

Collinsia Torreyi 4, 4a

Comandra pallida 1

Cryptantha affinis 2, 3, 4

Cryptantha simulans 2, 3, 4

Cryptantha Torreyana 1

Cynoglossum occidentale 3

Cyperus Congdonii 4

Dactylis glomerata* 4a

Delphinium patens 1

Deschampsia caepitosa 2, 4

Deschampsia danthonoides 2, 4

Dodecatheon Hansenii 1

Epilobium paniculatum 3, 4, 4a

Equisetum arvense 1

Erodium cicutarium 1

Festuca arundinacea* 4a

Fremontodendron californicum 1

Fritillaria micrantha 1

Galium Aparine 1

Gayophytum diffusum 2, 3, 4

Gayophytum eriospermum 2, 3, 4

Gayophytum Nuttallii 2, 3, 4

Gnaphalium chilense 2, 4

Hackelia mundula 2, 3

Heleocharis palustris 1

Hieracium horridum 2, 4, 4a

Hypericum anagalloides 2, 4

Juncus oxymeris 1, 2, 4

Linanthus ciliatus 3

Linanthus montanus 1

Lithophragma Congdonii 1

Lithophragma parviflora 1

Lonicera interrupta 1

*Indicates introduced species

Lotus micranthus 1

Lotus nevadensis 3, 4

Lotus oblongifolius 4

Lotus Purshianus 2, 3, 4

Lupinus bicolor 1

Lupinus Stiversii 1

Madia exigua 1

Medicago sativa* 4a

Melilotus indicus 4

Mentzelia dispersa 2, 3, 4

Mimulus moschatus 4

Montia perfoliata forma augustfolia 1

Onobrychis viciaefolia* 4a

Orthocarpus attenuatus 1

Parvisedum pumilum 1

Pellea mucronata 1

Penstemon breviflorus 1

Penstemon Newberryi 2

Phacelia mutabilis 2, 3

Phacelia hydrophylloides 2, 3, 4a

Phacelia Quickii 3

Phacelia racemosa 3

Pinus Jeffreyi 2, 3, 4, 4a

Pinus Lambertiana 4

Pinus Murrayana 2

Pinus ponderosa 1

Plagiobothrys tenellus 1

---

*Indicates introduced species

Plantago spp. 4

Poa scabrella 1

Potentilla glandulosa 1, 2, 3, 4

Prunus emarginata 2, 3, 4, 4a

Pteridium aquilinum 1, 3

Pyrola picta 3

Quercus chrysolepis 1

Quercus Kelloggii 1, 3

Quercus vaccinifolia 4

Ranunculus californicus 1

Rhamnus rubra 3

Rhus diversiloba 1

Ribes cereum 2, 3

Ribes Roezlii 1, 2, 3, 4, 4a

Ribes viscosissimum 2, 3

Rorippa curvisiliqua 2, 3, 4

Rosa pisocarpa 1

Rubus parviflorus 3

Rumex angiocarpus 1, 2, 4

Salix Scouleriana 1, 2, 3, 4

Sambucus caerulea 2, 3, 4

Sanicula bipinnata 1

Saxifraga californica 1

Scutellaria Bolanderi 1

Senecio aronicoides 4

Silene Lemmonii 3

Sitanion jubatum 2, 4, 4a

Solanum Xantii 3, 4

Stergularia rubra 2, 3

Streptanthus diversifolius 1

Streptanthus tortuosus 4

Symphoricarpos acutus 3, 4

Tauschia Hartwegii 1

Trifolium spp. 1

Vaccinium occidentale 2

Viola purpurea 1

Viola quercetorum 2, 3, 4

Vulpia microstachys var. pauciflora 1

Wyethia elata 1

OTHER FOOD ITEMS

Bark 2, 3, 4, 4a

Charcoal 1, 2, 3, 4

Cow pie 1

Decomposing granite 4

Deer pellets 1, 2, 3, 4, 4a

Dirt 1, 2, 3, 4, 4a

Fungus 3, 4

Lichens 1

Litter 1, 2, 3, 4, 4a

Moss 1, 3, 4

Mushroom 2, 3

Puffball 2, 4

Wood 1

APPENDIX II. Plant phenology observations on the Blue Canyon study site during May 1976.

2-4 May 1976

Arctostaphylos mariposa	Small plants of this species have 1-1.5 cm of new growth. Larger bushes are in full flower.
Ceanothus cuneatus	Phenology of plants is variable. Some have 10 cm of new growth, but most have less.
Chamaebatia foliolosa	Most plants have 1-2 new leaves developing. A few of the plants are in flower.
Quercus Kelloggii	All of the trees are in flower. Most plants have about 4 small, reddish leaves out of the buds.
Ribes Roezlii	Phenology is somewhat variable. Plants have 3-5 leaves out of the fascicles.
Rhamnus crocea	Phenology of this species is variable. Some plants are beginning to flower. The plants have 2-6 new leaves developed.
Ceanothus integerrimus	New growth varies and is up to 6 cm in length. Some inflorescences are developing.

7-11 May 1976

Arctostaphylos mariposa	Most plants have at least some new growth available for deer. Some of the new growth is beginning to turn from reddish to green.
Ceanothus cuneatus	These plants have 3-5 cm of new growth. The population is in flower.
Chamaebatia foliolosa	Virtually all buds have broken. The plants have up to 4 leaves out of the axils, two of which are nearly full-sized.
Quercus Kelloggii	New leaves on trees are almost full sized, but leaves on shrubs and stumps sprouts are still small and reddish.

Ribes Roezlii	Most plants have about 6 full-sized leaves out of the fascicles.
Rhamnus crocea	Some leaders are up to 10 cm in length. Quite a bit of new growth is available to deer.
Ceanothus integerrimus	These plants have 4-6 new leaves developed. Two to 4 of these leaves are full-sized.

14-16 May 1976

Arctostaphylos mariposa	Most of the leader growth is about 5 cm in length. Some flowers are dropping off the plants.
Ceanothus cuneatus	More new growth available than during the last sampling period. Leaders are between 5 and 8 cm in length.
Chamaebatia foliolosa	About 6 leaves are out of the buds and 2-3 of these leaves are full-sized.
Quercus Kelloggii	These plants have 6-8 leaves out of the buds and 2-3. Two to 3 leaves are full-sized.
Ribes Roezlii	Most plants have 6-8 full sized leaves out of the fascicles.
Rhamnus crocea	In general, about 6 leaves are out of the buds. Two to 3 of these leaves are full sized.
Ceanothus integerrimus	Six to 8 leaves have emerged from the buds. About 4 of the new leaves are full-sized.

APPENDIX III. Plant phenology observations for patchcut-meadow study sites during summer 1976 in the Sierra National Forest.

SUGAR PINE HILL

28 June-1 July 1976

Ceanothus cordulatus	New leader growth is up to 10 cm in length. The plants are in full flower.
Arctostaphylos patula	Most of the plants on this site are small and have new leader growth up to 5 cm in length.
Ribes Roezlii	These plants have new leader growth to 15 cm and about 12 leaves out of the axils. Some berries are turning red.
Apocynum pumilum	Plants starting to flower. These plants have about 4 cm of new leader growth.
Gayophytum spp.	These species are growing vigorously and beginning to flower.
Calyptridium umbellatum	Vegetative growth is nearly full sized. A few of the flowers are drying and beginning to fall off of the plants.

26-28 July 1976

Ceanothus cordulatus	New leader growth is up to 30 cm in length. The fruits are almost full-sized.
Arctostaphylos patula	Plants of this species have about 15 cm of new leader growth.
Ribes Roezlii	These plants have 20-30 cm of new leader growth out. Nearly all the berries are full-sized.
Apocynum pumilum	New growth is up to 10 cm in length. The fruits are developing.
Gayophytum spp.	This species is in full bloom. Vegetative growth is continuing.
Calyptridium umbellatum	No change in phenological condition from the previous sampling period.

23-26 August 1976

Ceanothus cordulatus	These plants have up to 40 cm of new growth. The leaders are beginning to be eaten by livestock. Moisture stress on these plants is apparent.
Arctostaphylos patula	It is hard to determine the total amount of new growth as the leaders are being eaten by livestock and/or deer.
Ribes Roezlii	These plants have 30-40 cm of new growth out on the leaders. Almost all of the fruits are dark red and mature.
Apocynum pumilum	The plants are starting to dry and a few leaves are falling. Some of the fruits are mature.
Gayophytum spp.	Most of the plants are beginning to dry. Fruits are mature on the smaller species.
Calyptridium umbellatum	The leaves have ceased vegetative growth and the flowers and fruits have fallen off the plants.

21-22 September 1976

Ceanothus cordulatus	The leaves are beginning to dry and fall off the plants. New growth has ceased completely.
Arctostaphylos patula	Most new growth has been consumed.
Ribes Roezlii	The fruits are completely mature and have begun to fall off the plants. About one-third of the leaves have fallen from the plants.
Apocynum pumilum	About one-third of the leaves have fallen from plants of this species.
Gayophytum spp.	Most of the plants are dry. There is little use of this species by the tame deer.
Calyptridium umbellatum	No change in phenological condition from the previous sampling period.

4-6 October 1976

Ceanothus cordulatus	About one-half of the leaves have dropped from the plants. Most of the fruits have dropped.
Arctostaphylos patula	No change from previous sampling period.
Ribes Roezlii	Most of the fruits and about one-half of the fruits have fallen from the plants.
Apocynum pumilum	About one-half of the leaves have dried and fallen from the plants.
Gayophytum spp.	Most plants are completely dried.
Calyptridium umbellatum	Plants continuing to dry out and drop leaves.

CLEAR CUT 1

16-18 June 1976

Ceanothus cordulatus	These plants have up to 3-4 cm of new leader growth. Plants are beginning to flower.
Arctostaphylos patula	About 3-4 cm of new leader growth.
Ribes Roezlii	Some plants have to 10 cm of new growth. Most of the plants are in flower.
Ribes cereum	These plants are in flower. Most plants have up to 5 cm of new growth out on leaders.
Gayophytum spp.	Growing vegetatively. Very few plants flowering at this time.
Calyptridium umbellatum	Plants in full flower and growing vegetatively.

5-8 July 1976

Ceanothus cordulatus	This species has up to 10 cm of new growth out of the buds. The fruits are beginning to develop.

Arctostaphylos patula	Most plants have 5-8 cm of leader growth.
Ribes Roezlii	These plants have up to 10 cm of new growth. The plants are past full bloom and many fruits are about one-half of full size.
Ribes cereum	About 15-20 cm of new growth on these plants. Fruits have started to develop. The plants are showing some moisture stress.
Gayophytum spp.	Plants are more abundant than during the last sampling period, but it is difficult to quantify the increase in foliage.
Cadyptridium umbellatum	Flowers are beginning to dry.

2-5 August 1976

Ceanothus cordulatus	These plants have 10-15 cm of new growth. Fruits are about 5 mm in diameter.
Arctostaphylos patula	This species has about 10-15 cm of new growth out of the buds.
Ribes Roezlii	These plants have about 15 cm of new growth out. The fruits are developing.
Ribes cereum	New growth from the terminal leaders is about 15-20 cm in length. The plants are past flowering.
Gayophytum spp.	About two-thirds of the plants are in flower. Vegetative growth of these species is continuing.
Calyptridium umbellatum	This species is past full flower and fruits are beginning to develop.

28-30 August 1976

Ceanothus cordulatus	Much of the new growth has been eaten by livestock. The leaves are just starting to fall and the fruits are maturing.

Arctostaphylos patula	Most new growth has been used by livestock and/or deer. The berries are full-sized.
Ribes Roezlii	The leaves have begun to dry and fall from the plants. The berries are mature.
Ribes cereum	New growth has ceased and is to about 40 cm. Some use of leader growth by livestock. The fruits are ripe.
Gayophytum spp.	Most of the plants are drying; a few are still in flower.
Calyptridium umbellatum	Most of the flowers have dropped from the plants.

CLEAR CUT 2

21-24 June 1976

Ceanothus cordulatus	The plants have about 8 cm of new growth out and are about two-thirds to full bloom.
Arctostaphylos patula	This species has about 5 cm of new leader growth.
Ribes Roezlii	This species has about 8 cm of new growth developed. Fruits are beginning to develop spines.
Ribes cereum	The plants are past full bloom and have about 8-10 cm of new leader growth.
Gayophytum spp.	Plants are growing vigorously and a few are in flower.
Calyptridium umbellatum	These plants are growing vigorously and are in full flower.

12-15 July

Ceanothus cordulatus	Most of the terminal leaders have between 15-25 cm of new growth. The plants are just past full bloom and the fruits are developing.

Arctostaphylos patula	Plants of this species have 5-10 cm of new leader growth.
Ribes Roezlii	Plants have about 10 cm of new growth and fruit development is beginning.
Ribes cereum	The fruits on this species are nearly full sized. Most leaders are about 15 cm in length.
Gayophytum spp.	About one-third of the population is in flower. These plants are still growing vigorously.
Calyptridium umbellatum	Plants of this species are just past full flower.
9-12 August 1976	
Ceanothus cordulatus	These plants have terminal leaders up to 20-30 cm in length. Fruits are about 5 mm in diameter.
Arctostaphylos patula	Terminal leaders of this species are about 15-20 cm in length.
Ribes Roezlii	Leader growth is varied between 5 and 20 cm in length. Fruits are nearly full-sized.
Ribes cereum	Leaders are between 25-30 cm in length.
Gayophytum spp.	About one-half the population is in flower. This species seems to be much more abundant than during the last sampling period.
Calyptridium umbellatum	Most of the flowers have dried and dropped from this species.
2-4 September 1976	
Ceanothus cordulatus	Most of the leaders have been eaten by livestock.
Arctostaphylos patula	Most of the new growth has at least been partially used by livestock and/ or wildlife.

Ribes Roezlii	Fruits are mature and the leaves are beginning to drop.
Ribes cereum	These plants are showing some moisture stress. Some of the leader growth has been eaten by livestock.
Gayophytum spp.	These plants are drying and the fruits are mature.
Calyptridium umbellatum	All of the flowers have dropped from these plants and some of the leaves are beginning to dry.

APPENDIX IV. Vegetative cover available to deer as measured by the line intercept method for the Sugar Pine Hill study site on the summer range of the North Kings deer herd, Sierra National Forest

SPECIES	Total Cover (cm)	Mean n = 21 (cm)	Standard Error	Percent Cover
BROWSE				
Arctostaphylos nevadense	837	39.9	28.88	0.44
Arctostaphylos patula	1653	78.7	30.33	0.87
Ceanothus cordulatus	90281	4299.1	223.27	47.77
Ceanothus paryifolius	741	35.3	21.16	0.39
Libocedrus decurrens	26	1.2	1.24	0.01
Pinus Lambertiana	32	1.5	1.52	0.02
Pinus Jeffreyi	6233	296.8	44.70	3.30
Prunus emarginata	214	10.2	5.39	0.11
Ribes cereum	305	14.5	8.38	0.16
Ribes Roezlii	1292	61.5	29.63	0.68
Salix spp.	7	0.3	0.33	T
Sambucus caerulea	590	28.1	18.53	0.31
FORBS				
Apocynum Pumiluin	290	13.8	6.45	0.15
Arabis Hoelbellii	132	6.3	2.67	0.07
Arabis spp.	237	11.3	6.50	0.13
Cirsium Andersonii	46	2.2	1.63	0.02
Cryptantha affinis	112	5.3	5.33	0.06
Erigonum latifolium	56	2.7	2.67	0.03

APPENDIX IV (Continued)

SPECIES	Total Cover (cm)	Mean n = 21 (cm)	Standard Error	Percent Cover
Erigonum spergulinum	15	0.7	0.71	0.01
Gayophytum diffusum	13	0.6	0.46	0.01
Gayophytum Nutalli	5	0.2	0.24	T
Horkilia tridentata	14	0.7	0.67	0.01
Phacelia hydrophylloides	16	0.8	0.76	0.01
Plantago spp.	35	1.7	0.99	0.02
Senecio Aronicoides	9	0.4	0.43	T
Solanum Xantii	312	14.9	10.74	0.17
Viola purpurea	28	1.3	1.15	0.01
GRASSES AND GRASS-LIKE				
Carex spp	408	19.4	15.46	0.22
Deschampsia danthonoides	22	1.0	1.05	0.01
Sitanion Hansenii	112	5.3	3.95	0.06
Stipa spp.	37	1.8	1.08	0.02
TOTAL	104822	4991.5	217.91	55.07

APPENDIX V. Vegetative cover available to deer as measured by the line intercept method for the Clear Cut one study site on the summer range of the North Kings deer herd, Sierra National Forest

SPECIES	Total Cover (cm)	Mean n = 81 (cm)	Standard Error	Percent Cover
BROWSE				
Abies spp.	510	6.3	2.19	0.07
Arctostaphylos nevadense	632	7.8	2.60	0.09
Arctostaphylos patula	2497	30.8	4.06	0.34
Ceanothus cordulatus	63251	780.9	59.97	8.68
Pinus Jeffreyi	33222	410.1	20.54	4.56
Prunus emarginata	88	1.1	0.57	0.01
Rhamnus rubra	98	1.2	0.85	0.01
Ribes cereum	87413	1079.2	56.05	11.99
Ribes nevadensis	15	0.2	0.19	T
Ribes Roezlii	385	4.8	2.41	0.05
Ribes viscosissimum	3197	39.5	9.99	0.44
Salix spp.	143	1.8	0.98	0.02
Sambucus caerules	11214	138.5	20.86	1.54
FORBS				
Allium campanulatum	10	0.1	0.12	T
Apocynum pumilum	4	0.1	0.05	T
Arabis Hoelbellii	36	0.4	0.33	T
Aster foliaceus	19	0.2	0.17	T

APPENDIX V (Continued)

SPECIES	Total Cover (cm)	Mean n = 81 (cm)	Standard Error	Percent Cover
Calyptridium umbellatum	156	1.9	0.48	0.02
Caselleja disticha	58	0.7	0.72	0.01
Calystegia malacophylla	11	0.1	0.14	T
Cirsium Andersonii	266	3.3	1.51	0.04
Cryptantha affinis	39	0.5	0.35	0.01
Cryptantha simulans	156	1.9	0.61	0.02
Epilobium Pringleanum	11	0.1	0.11	T
Eriogonum spergulinum	422	5.2	3.97	0.06
Gayophytum diffusum	3418	42.2	9.60	0.47
Gayophytum Nutalli	9075	112.0	21.15	1.24
Gnaphalium palustre	113	1.4	0.59	0.02
Hacklia mundula	862	10.6	3.82	0.12
Hacklia velutina	289	3.6	1.81	0.04
Hieracium horridum	28	0.4	0.35	T
Hypericum anagalloides	8	0.1	0.10	T
Linanthus ciliatus	5	0.1	0.06	T
Linanthus spp.	55	0.7	0.68	0.01
Lotus crassifolius	35	0.4	0.43	T
Lotus Purshianus	33	0.4	0.31	T
Lupinus latifolius	4	0.1	0.05	T
Mentizelia dispersa	41	0.5	0.47	0.01
Mimulus floribundus	43	0.5	0.46	0.01
Phacelia hydrophylloides	29843	368.4	44.31	4.09

APPENDIX V (Continued)

SPECIES	Total Cover (cm)	Mean n = 81 (cm)	Standard Error	Percent Cover
Phacelia mutabalis	479	5.9	1.36	0.07
Potentilla glandulosa	67	0.8	0.55	0.01
Rumex angiocarpus	140	1.7	0.92	0.02
Senecio aronicoides	98	1.2	0.63	0.01
Silene Lemonii	4	0.1	0.05	T
Solanum Xantii	520	6.4	2.15	0.07
Spergularia rubra	835	10.3	2.90	0.11
Viola purpurea	75	0.9	0.55	0.01
Viola quercetorium	8	0.1	0.07	T
GRASSES AND GRASS-LIKE				
Bromus orcuttianus	25	0.3	0.31	T
Carex spp.	1424	17.61	6.55	0.20
Deschampsia danthonoides	347	4.31	2.61	0.05
Juncus spp.	455	5.61	2.42	0.06
Poa Bolanderi	93	1.2	0.81	0.01
Sitanion Hansenii	47	0.6	0.58	0.01
TOTAL	252508	3117.4	105.15	34.60

APPENDIX VI. Vegetative cover available to deer as measured by the line intercept method for the Clear Cut two study site on the summer range of the North Kings deer herd, Sierra National Forest

SPECIES	Total Cover (cm)	Mean n = 88 (cm)	Standard Error	Percent Cover
BROWSE				
Abies spp.	255	2.9	1.70	0.03
Arctostaphylos patula	5607	63.7	13.34	0.71
Ceanothus cordulatus	70008	795.6	59.51	8.84
Chrysolepis sempervirens	86	1.0	0.69	0.01
Pinus Jeffreyi	30882	350.9	24.03	3.90
Prunus emarginata	950	10.8	3.19	0.12
Rhamnus rubra	627	7.1	7.12	0.08
Ribes cereum	17542	199.3	24.16	2.21
Ribes nevadensis	98	1.1	0.58	0.01
Ribes Roezlii	49189	559.0	42.15	6.21
Ribes viscosissimum	2066	23.5	8.66	0.26
Salix spp.	51	0.6	0.38	0.01
Sambucus caerulea	4865	55.3	9.79	0.61
Symphoricarpos acutus	317	3.6	2.21	0.04
FORBS				
Anaphalis margaritacea	58	0.7	0.29	0.01
Arabis Hoelbellii	11467	130.3	21.10	1.45
Arabis spp.	1562	17.8	7.87	0.20
Aster foliaceus	17	0.2	0.19	T
Barbarea orthoceras	753	8.6	3.87	0.10
[illegible]	473	5.4	1.74	0.06

APPENDIX VI (Continued)

SPECIES	Total Cover (cm)	Mean n = 88 (cm)	Standard Error	Percent Cover
Castelleja disticha	48	0.6	0.34	0.01
Calystegia malacophylla	266	3.0	1.52	0.03
Cirsium Andersonii	89	1.0	0.43	0.01
Chaenactis Douglasii	23	0.3	0.26	T
Cryptantha affinis	203	2.3	1.26	0.03
Cryptantha simulans	1706	19.4	4.24	0.22
Cynoglossum occidentale	85	1.0	0.60	0.01
Epilobium Pringleanum	57	0.6	0.43	0.01
Eriogonum spergulinum	102	1.2	1.16	0.01
Gayophytum diffusum	2716	30.9	3.92	0.34
Gayophytum Nutalli	2411	27.4	6.59	0.30
Gilia capillaris	95	1.1	0.30	0.01
Gnaphalium palustre	7	0.1	0.08	T
Hacklia mundula	198	2.2	1.71	0.02
Horkilia tridentata	6	0.1	0.07	T
Hypericum anagalloides	113	1.3	0.97	0.01
Kelloggia galoides	47	0.5	0.36	0.01
Linanthus ciliatus	540	6.1	1.62	0.07
Linanthus montanus	131	1.5	0.62	0.02
Lotus nevadense	56	0.6	0.34	0.01
Lotus Purshianus	31	0.4	0.29	T
Mentzelia dispersa	414	4.7	1.30	0.05
Mimulus discolor	17	0.2	0.19	T
Monardella odoratisima	175	2.0	0.87	0.02

APPENDIX VI (Continued)

SPECIES	Total Cover (cm)	Mean n = 88 (cm)	Standard Error	Percent Cover
Phacelia hydrophylloides	728	8.3	2.36	0.09
Phacelia mutabalis	35996	409.0	27.34	4.54
Phacelia racemosa	999	11.4	5.72	0.13
Phacelia ramosissima	5929	67.4	12.39	0.75
Plagiobothrys Torreyi	11	0.1	0.07	T
Potentilla glandulosa	224	2.6	0.92	0.03
Pteridium aquilinum	292	3.3	1.22	0.04
Rorippa curvisilique	6	0.1	0.05	T
Rumex angiocarpus	10	0.1	0.11	T
Solanum Xantii	43040	489.1	34.57	5.43
Spergularia rubra	188	2.1	0.90	0.02
Viola purpurea	78	0.9	0.25	0.01
Viola quercetorium	65	0.7	0.68	0.01
GRASSES AND GRASS-LIKE				
Bromus orcuttianus	1	T	0.01	T
Carex spp.	10540	119.8	25.46	1.33
Deschampsia danthonoides	47	0.5	0.43	0.01
Juncus oxymerus	1770	20.1	5.62	0.22
Poa Bolanderi	215	2.4	2.36	0.03
Stipa spp.	141	1.6	1.29	0.02
TOTAL	307902	3498.9	97.02	38.73

APPENDIX VII. Selectivity indices from PSW grants 17 and 19 recomputed on the basis of absolute cover.

SPECIES	27 Dec-31 Jan	14 Feb-17 Mar	24 Mar-28 Apr	27 Dec-28 Apr
	Haslett Basin 1974-1975			
Ceanothus leucodermis	6.42	12.83	62.08	29.42
Quercus Douglasii	61.45	16.38	8.21	23.41
Rhamnus crocea	23.00	16.29	11.57	16.07
Lotus scoparius	0.50	2.64	28.50	11.64
Cercocarpus betuloides	3.43	2.86	12.86	6.71
Arctostaphylos mariposa	1.77	1.98	14.26	6.44
Penstemon breviflorus	1.33	1.44	7.33	3.56
Ceanothus cuneatus	3.11	3.78	1.81	2.89
Quercus Wislizenii	2.67	0.67	1.89	1.56
Eriodictyon californica	0.18	0.09	0.08	0.10
	Blue Canyon May 1975			
	9-12 May	17-21 May	26-28 May	9-28 May
Ceanothus integerrimus	61.40	166.00	127.70	120.40
Quercus Kelloggii	19.10	32.15	58.00	36.70
Cercocarpus betuloides	17.40	8.00	7.20	10.70
Ribes Roezlii	11.04	3.81	1.42	5.29
Ceanothus cuneatus	0.78	0.77	1.62	1.05
Arctostaphylos mariposa	0.90	0.70	1.04	0.88
Pinus ponderosa	0.36	0.58	1.13	0.70
Chamebatia foliolosa	0.15	0.08	0.03	0.09

APPENDIX VII (Continued)

Yearlings -- Brush Slope 1 summer 1975

SPECIES	30 Jun-7 Jul	14 Jul-30 Jul	14 Aug-6 Sep	30 Jun-6 Sep
Quercus Kelloggii	20.83	21.50	6.42	14.62
Arctostaphylos patula	5.32	6.20	3.52	4.75
Prunus emarginata	2.11	3.71	4.60	3.63
Symphoricarpos acutus	2.02	2.40	4.81	3.35
Corylus cornuta	3.90	3.59	1.58	2.79
Ceanothus cordulatus	2.75	2.01	2.89	2.62
Chrysolepis sempervirens	1.71	2.00	0.72	1.35
Ribes Roezlii	1.51	0.47	1.58	1.27
Pteridium aquilinum	0.11	0.45	1.79	0.95
Abies concolor	0.17	0.38	0.56	0.40

Fawns -- Lupine Area summer 1975

SPECIES	18 Aug-20 Aug	21 Aug-2 Sep	11 Sep-14 Sep	18 Aug-14 Sep
Pinus Lambertiana	66.50	111.72	154.28	132.33
Potentilla glandulosa	6.56	16.44	8.19	9.94
Ceanothus parvifloius	1.69	3.19	14.09	6.89
Salix spp.	1.26	3.91	7.11	4.26
Ceanothus cordulatus	2.49	2.41	2.03	2.29
Pinus Jeffreyi	1.94	0.55	1.65	1.44
Pteridium aquilinum	0.70	0.77	0.55	0.66
Chrysolepis sempervirens	0.32	0.37	0.90	0.56
Arctostaphylos patula	0.17	0.62	0.40	0.39
Lupinus latifolius	0.10	0.18	0.16	0.16

APPENDIX VII (Continued)

SPECIES	1 Aug-4 Aug	14 Aug-21 Aug	31 Aug-3 Sep	18 Sep-21 Sep	2 Oct-5 Oct	1 Aug-5 Oct
	Fawns -- Brush Slope 1 summer 1975					
Symphoricarpos acutus	5.93	5.73	10.01	18.38	11.45	10.82
Quercus Kelloggii	0.12	15.23	5.81	3.52	8.65	6.51
Ribes Roezlii	6.12	4.84	6.16	6.92	5.25	5.83
Ceanothus cordulatus	3.52	3.46	3.17	2.58	2.76	3.09
Arctostaphylos patula	9.52	1.75	3.25	1.42	2.92	2.68
Prunus emarginata	0.57	1.30	1.50	2.68	1.54	1.48
Pteridium aquilinum	0.78	0.47	0.54	0.89	2.53	1.17
Abies concolor	0.84	1.19	1.40	1.11	1.32	1.15
Chrysolepis sempervirens	0.21	0.33	0.31	0.49	0.41	0.35